adapted to closely receive the other side of the adjoining sheet in the manner of tongue and groove attachment.

As is best seen in FIGS 8 and 9, connection of fluid and gas supplies to panels 13 is effected by a manifold 32 attached to the panel ends 54 and 55. Manifold 32 is a longitudinally extending extrusion having fluid communication means in the form of a central channel 38 for the inflow or outflow of fluid to or from fluid conduits 19, and gas communication means in the form of a pair of channels 34 and 35 for the inflow or outflow of gas to or from external conduits 23 and 25 respectively. Manifold 28 includes receiving means in the form of a central opening 39 to central channel 38 for receiving internal sheets 16 and 17, and receiving means in the form of slots 36 for receiving external sheets 20 and 21 whereby the fluid communication means 38 and the gas communication means 34 and 35 are sealingly connected to the fluid passageway and the external passageways respectively.

Channels 34 and 35 communicate with the external passageways and external conduits 23 and 25 via longitudinally extending slots 40 in longitudinally extending ribs 37 on either side of central opening 39. Ribs 37 are closely received in external passageways 52 and 53 at the ends 54 and 55 of panel 13.

It will be seen that the ends of interior panels 16,17 extend beyond the ends of external panels 20,21 thereby facilitating ultrasonic or other fusion welding of manifold 32 to the interior panels 20,21. This provides a better seal to the internal passageways than is obtained by adhesive bonds and the like.

The fluid or gas supply is connected to manifold 32 by means of a ported cap (not illustrated) which fits closely over one end of the manifold and has connection flanges for connecting gas and/or water lines to the manifold. A blind cap seals the other end of the manifold.

The manifold can be of a standard length corresponding to the width of a heat exchanger panel. Alternatively the manifold can be of variable length which is cut to a required length to suit individual installations with one manifold extending across a number of adjoining panels.

As with joining strips 28, manifolds 32 can be made from suitable plastic, rubberised material, fibreglass, aluminium or rolled steel. Suitable mastic sealers can also be used to improve the seal between the manifold and the ends of the panel.

In use, a method of heat exchange in accordance with the present invention is effected by passing fluid through internal fluid passageway 51 formed between internal sheets 16 and 17, whereby heat is exchanged between the fluid and gas in external passageways 52 and 53 formed between internal sheet 16 and 17 and a respective external sheet 21 and 20.

As can be seen in FIG 9, a riser 60 extends from the uppermost manifold 32 and vents to atmosphere to provide a pressure relief mechanism in the fluid passageway to relieve excess pressures which may be generated during heating of the fluid. Riser 60 comprises a U-tube which communicates with central fluid channel 38 in the manifold. A ball valve or the like (not shown) can be included in the down stream leg of the U-tube.

It will be appreciated that the heat exchange panel of the present invention has a number of advantages of known systems.

The external passageways of the present invention provide a layer between the fluid passageway and the ambient conditions and depending on the gas therein improves the efficiency of absorption of solar radiation or, in providing an insulating layer can improve the effectiveness of retention of heat generated by solar radiation.

The multiple passageway construction allows the cooling and heating properties of gases such as free air and inert gases to be exploited. The gas carrying external passageways moreover enable the heat exchanger assembly of the present invention to function in conditions where solar radiation is minimal or non-existent.

The venting of the panels ensures that the operating pressure within the fluid circuit is consistent with atmospheric pressure thereby avoiding pressure induced failure of the panel.

It will of course be realised that whilst the above has been given by way of an illustrative example of this invention, all such and other modifications and variations hereto, as would be apparent to persons skilled in the art, are deemed to fall within the broad scope and ambit of this invention as is herein set forth.